# SCULPTING SOUND

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## Abstract

This thesis describes the philosophy and techniques I applied to transform drawing into sound. In my work, drawing and sound depend on each other to exist, the respective characteristics and qualities of one are dependant on the existence of the other: drawing begets sound as sound begets drawing. In this way, I strive to reveal the hidden meaning of my drawings through sound. This approach offers a multisensory experience to the audience intertwining the sense of hearing with the sense of sight. What does it mean to experience sound through the eyes and drawings through the ears?

*Sculpting Sound* is divided into three chapters:

I. *The Connection Between Drawing & Sound*, describing the artistic and philosophical background that inspired me to work with animal species.

II. *Sound of Drawing,* referring to the sonification of graphite in a performative and visual context.

III. *The Ultimate Drawing,* explaining the conclusion and insights of sculpting sound through drawing.

The works presented are:

- *Sound of* Beasts (2015), a drawing and sound installation that stimulates a multisensory experience.
- *Sonic Drawings* (2013–2015), an audiovisual performance project, which connects a drawing performance with playing a sound instrument.
- *Sound of a Dead Body* (2015), a performance that sonifies drawing and its gestures.
- *The Book of Repression* (2015), a photograph that illustrates the act of drawing through a sound piece.

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Audio CD on the back cover

***Highlight = Artwork***

# I.

# The Connection Between Drawing & Sound

## *Background*

In addition to drawing, music making has always been part of my artistic practise. I grew up in the roughness of Monclova, a small city in the north of Mexico surrounded by the desert and its silence. My attraction to drawing started as an intuitive and introspective activity, as a desire to re-shape the void of my environment: the white canvas became the place to adventure into the unknown through graphite on paper, and music became the water that filled up my drought with its unlimited harmony. Nevertheless, it took me fifteen years to fully develop drawing to what I do today and twenty-three years to realise that my two biggest passions could be unified into a single one by designing my own instruments.

I was fascinated by the discovery that a silent drawing could become audible. A drawing is normally seen as the outcome of a private communication process between the mind and the hand's muscles, and remains as an intimate act between the artist and his/her practise. But what if that process, apart from being perceived by the sense of sight, could be also captured by the sense of hearing? When combining these senses to experience an artwork, how we see and how we listen can determine what we hear. Looking at a drawing, for instance, our experience can be different depending on the context where the piece is shown; if silence or sound permeates the space it can influence the way we perceive it. What would it mean to experience sound through the eyes and drawings through the ears?

In order to broaden the way of perceiving a drawing, my curiosity in sound led me to pursue the creation of an instrument that would allow me to draw and create sounds at the same time. I designed the instrument so it gives me a

similar precision that a graphite pencil has, so my drawing aesthetic could be extended to the sound domains.

All the works included in this thesis are based on the idea of transforming drawing into sound. Since Jacques Derrida's philosophy has a significant role in my artistic practise, I first introduce what inspires me from his idea of *deconstruction*, *animals* and *the other*. What follows is the description of the artwork *Sound of Beasts,* which acted as a catalyst to transform the intimacy of drawing into a visual and sonic journey. Also an audio CD containing the *Sound of Beasts* soundtrack is included on the back cover of this book.

## *Jacques Derrida & The Language of The Others*

Jacques Derrida (1930-2004) was a French/Algerian philosopher that questioned the Western philosophical tradition with the concept of *deconstruction:* a strategy of critical questioning that rejects all assumptions and attempts to unmask language and meaning in a literary and philosophical aspect. In other words, deconstruction is not to assume that what is conditioned by history, institutions or society is natural. It proposes a decentralisation of meaning, prevents the worst violence and strives to render justice. With this strategy Derrida challenged dominant discourses like that of metaphysics, arguing that it creates hierarchical binary oppositions that dominate the way of thinking —presence/absence, human/animal, male/female, etc.— and that in such oppositions there is always one side which is privileged, and one which is ignored and/or marginalised. And it is precisely this last one, usually described as *the other*, in which I am interested.

*The other* refers to that one who is usually outside my centre of focus, that other who is different from me and is sometimes excluded and displaced to the margins. It is also a reference to a minority or to a least-favoured group, like someone from a different race or a nonhuman being, as those ones segregated under the *animal* term. In his texts, Derrida approaches the animal as *the living other.* He constantly deals with the problem of moral obligation of humans to nonhuman animals, questions what is proper in men and what distinguishes man from animals in general, all in an effort to uncover the unjustifiably arguments that humans have used to define themselves in opposition to animals, claiming superiority by all means. In an interview[1], he

[1] The interview found in: https://www.youtube.com/watch?v=Neu4kI_Yi0A was filmed for "Derrida", a 2002 documentary film directed by Kirby Dick and Amy Ziering Kofman.

mentions that calling them *animals* is to enclose them in a cage. There are immense variations between different species of animals, so it makes no sense to group under a common term the fish, birds, elephants, insects, etc., and to put them into the same category is a repressive and violent gesture, which excludes and unites all that is living and not human or plant, under the label of *the other.*

Throughout the history of philosophy, from Aristotle to Heidegger, the essence of the human being has been imposed to that one of the animal arguing that animals do not feel, do not have consciousness, do not have a language. Aristotle, for example, claimed that nature created animals so they can serve the needs of human beings. Descartes believed that animals were like machines, unable to feel pain, and that their mere existence was conditioned by humans. Heidegger considered that animals were *poor in the world* as they could only behave towards the objects they encounter, opposite to a human being, who can access the world thanks to a constant attunement, and exactly this ability to be attuned constitutes the particularity of human existence. On the other hand, Derrida's biggest concern was the status of *animality* (animal nature or character), as it clarified the limit between man and others by defining man in regards of what is not: an animal.

Jacques Derrida's philosophy and the question of the animal have been of great influence in my work. My source of inspiration is how animals are used in different contexts to explore humanity and how society has created a significant division between human beings and animal species.

For this reason, in my drawings there is a singular animal presence that does not attempt to objectify neither categorize, but to rethink the human-animal relation, the status of animals and our responsibility as human beings toward nonhuman animals.

How can we stop excluding *the other* from the circle of moral obligation?

## *Sound of Beasts*

Drawing & sound installation
Presented at *Uusi Nykyisyys I New Present*
XX Mäntän Kuvataideviikot / Mänttä Art Festival
14.6 - 31.8.2015

Photo: Eeva Karhu.

*Background*

*Sound of Beasts* is an installation comprising drawings from Jacques Derrida's Bestiary series and a soundtrack. The project is the result of a collaboration with Federico Rodríguez Gómez, a Spanish PhD in Philosophy. While I was living in Spain, from 2011 – 2012, we worked together to develop a bestiary of 27 drawings[2] to illustrate his book "*Cantos Cabríos. Jacques Derrida, un Bestiario Filosófico"* (Goat Song. Jacques Derrida, a Philosophic Bestiary). Therefore *Sound of Beasts* has been inspired by the author of the book, his reflections on animal philosophy and the animal presence in the world and in human life.

[2] About Jacques Derrida's Bestiary: http://www.anagutieszca.com/Derrida-s-Bestiary

*About the book*

*"Goat Song"* is a philosophic study about the role of animals in a theoretical framework based on the philosopher Jacques Derrida. It concentrates on the general problem of animals in philosophy (animal rights, consciousness, language, the responsibility of human beings toward nonhuman animals, etc…), but also animals as singular and textual presence. Animals do not represent anything; they are not vicars of anything neither anybody. When valued as only animals, and not calculated anthropomorphous variations, they impose themselves; they do things before anything can scare them. Hence animals impose themselves beyond any presupposed purpose: animals affect philosophy and philosophy is affected by animals.

At what point does the active presence of animals become a presence capable of realizing and explaining concepts and not the other way around? The physical movements of animals in all their configurations, mutations and metempsychosis; in their attacks or defensive maneuvers, in their voracity and tragedies, in their secrets and deaths, are like kaleidoscopic images; one image following another, forming itself from the ashes of the last ones, provoking situations that can lead to the discussion of concepts.[3]

The book derives from philosophic and poetic observations based on animals, as well as on the study of bibliographic sources constituted of a great amount of bestiaries edited throughout the history of western culture, and the animal presence in literature, philosophy, cinema or painting.

[3] Introduction of the book written by the author, Federico Rodríguez Gómez.

For *Cantos Cabríos*, Federico Rodríguez Gómez won the National Essay Prize, Chile 2013. Consequently the book was published by FCE, Fondo de Cultura Económica Chile at the end of 2015.[4]

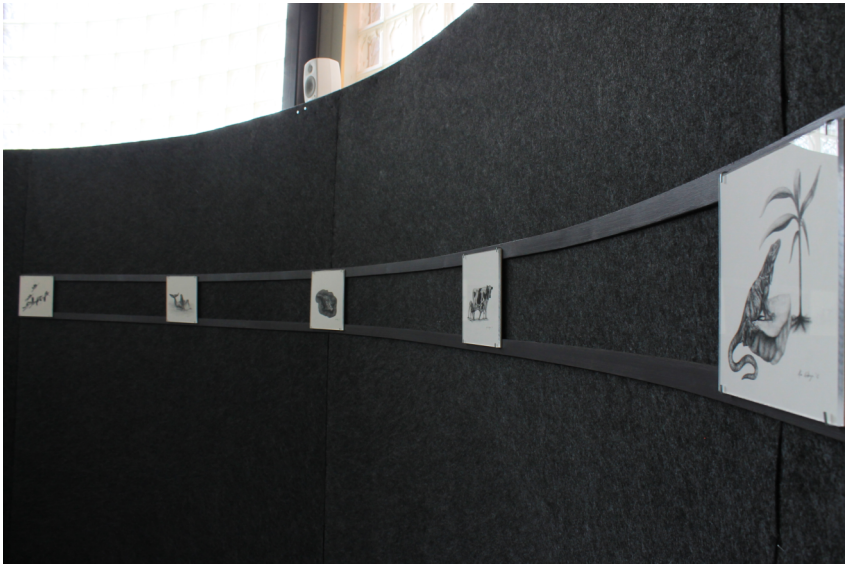
[4] The book can be found in http://www.fondodeculturaeconomica.cl/1dbcb7f4-6beb-4abb-8bd2-79673adb586f/Cantos-cabr%C3%ADos-Jacques-Derrida-un-bestiario-filos%C3%B3fico.aspx

*About the visual realisation*

*Sound of Beasts* addresses the question of the animal and its ambivalent presence as *the other.* In this artwork based on Jacques Derrida, the role of animals is deconstructed into a sound experience. Taking the form of an installation, the drawing and sound combination aims to stimulate multisensory experience through the principle of synaesthesia: one sensation finds its equivalent in another one.

Departing from the same principle of visual music where different methods are used to translate images into sound or vice versa, the two-dimensional work is expanded to the immersive three-dimensional environment through the use of two elements: sound and rope. The installation consists of one central piece, which is a drawing from my previous work focused on animals, ten drawings chosen from Jacques Derrida's Bestiary series and six sound pieces developed as a soundtrack for the following animals: goat, mantis, elephant, mongrel, torpedo ray and vixen. The drawings trace the relationship between image and sound; they engage the aural and visual on equal terms, and deal with how sound can affect the way a drawing is perceived and vice versa.

*Black Symphony* acts as the central piece. Suspended from the ceiling with a rope attached as a physical extension of the drawing, it invites the viewer to witness death as an aesthetic and meditative gesture, while *listening* and *feeling* the *Sound of Beasts* soundtrack where animals, the significant others, emerge in space as the oppressed voices we neglect to listen.



Installation view.

*Black Symphony* / Graphite on paper / 100 x 140 cm / 2009. Photo: Eeva Karhu.

The installation was a site-specific project, so the architecture of the space was an essential element of the work. Exhibited in a building of circular shape with almost 5 meters diameter and an approximate height of 7 meters, the upper part close to the ceiling was surrounded by a skylights wall (see pictures on page 17 and below). As a consequence, a feeling of warmth and tranquility was achieved through the exclusive use of natural light in the space. The composition of all visual elements resembled a temple, a sacred place where one can be guided to the contemplation of death, life and afterlife.

View of *pömpeli* (left), the exhibition space at Pekilo, Mänttä.

A 5.1 surround-sound speaker system was distributed in the room embracing the viewer. Entering the space, the dark graphite tones of a dead goat hanging from a rope were immediately striking the eyes, while sound turned the sudden impact into a lullaby that could be felt, transcending human understanding that conquered the ears.

In order to stimulate the involvement of different senses, a circular wooden seat hiding a subwoofer underneath was placed in the middle of the room (as seen on the next picture). One could sit or lay down, letting the physicality of sound take over the body through the vibrations caused by low frequencies contained in each sound piece. As a result, the sound experienced through the body enhanced the poetic qualities of grasping something invisible in the world that surrounds us.

*About the sonic realisation*

*"The composer's surface is an illusion into which he puts something real –sound. The painter's surface is something real from which he then creates an illusion."*
Brian O'Doherty.[5]

How does a goat awaiting its death *sound* like?
How does the body of a dead elephant dissolve through sound?
How can drawing produce a sound experience and vice versa?

I think by drawing. My work evolves from a cognitive process where drawing and sound meet in silence. Both manifestations come from emptiness; they are originated in abstract places until they meet in the physicality of space. In this way, sound serves as an extension of my drawings, expanding the understanding of a visual experience through the sense of hearing.

The space (white canvas) and the symbols that inhabit it (animals) remain at the core of my compositions. An emphasis on *the other* is given by empowering different species where their role is to appear to the viewer as something unreachable, something magical and mystical that a human being will never be able to understand. Through this gesture of using animals, allowing them to be present and to leave a sign, passive or without pretending, the intention is for them to become the ones who carry out specific movements, to be the ones who realize concepts and arise questions with their own non-verbal and sound based communication.

[5] Alan Licht. *Sound Art. Beyond music, between categories.* (New York: Rizzoli International Publications, Inc., 2007), 136.

Aristotle's *Politics* (350 BC) states that man is the only animal who has the gift of speech. But what happens when we leave aside our anthropocentric way of thinking to go beyond the conventional oppressive and ignorant human behaviour? Italian philosopher Giorgio Agamben mentions that even when there is a language difference between human beings (articulated human speech) and animal species (non-linguistic instinctual code), it does not mean that animals lack neither are denied language; on the contrary, animals, like humans, are linguistic beings, and they are fully immersed in language in the same way they are in their surrounding environment. So, in order to evidence that animals do have a language, I decided to remove the silence of my drawings by creating a sonic interpretation of the animal voices.

*Sound of Beasts* soundtrack[6] consists of six sound pieces where every image has its own sound and it has been composed by turning the animal drawings into sonic stories. I was given a list by Federico Rodríguez, which included the significance of each animal to be drawn for the bestiary. In order to illustrate it, the only condition was to base my drawings on the following descriptions:

1. *Goat*: biblical animal, symbol of sacrifice, of cruelty in the history of religion. The goat substitutes Isaac (Abraham's son) in the sacrifice of Mount Moriah. It is the animal of tragedy (tragedy, in Greek, signifies "goat song").
2. *Mantis*: symbol of sexual cannibalism; love is pushed to its limits and transformed into food.
3. *Elephant*: symbol of nature's submission. The biggest corpse ever imagined on earth, being scrutinised for the progress of science.

[6] *Sound of Beasts* soundtrack will be released on tape (PAI TP11) in June 2016 by PAI Tapes, Finnish independent record label. http://paitapes.bandcamp.com/

4. *Mongrel*: symbol of marginalisation, of the other. Street mongrels eat corpses of assassinated criminals.
5. *Torpedo ray*: animal with venomous spines or electric organs causing paralysis. Socrates was known for stunning people with his perplexing questions, similar to he way the torpedo ray stuns with electricity.
6. Vixen: the female fox that pretends to be dead by laying in a pond full of sludge, so she can hunt her victim.
7. *Monkey & dolphin*: the monkey is rescued from the waters it was about to drown. Based on La Fontaine's fable, the dolphin abandons him when he discovers the monkey on his back is an animal, not a human. Dolphins are friends of humans, not animals.
8. *Crane*: an old crane is symbol of wisdom, when facing a storm (symbol of evil) it cracks its beak and changes the flock's direction.
9. *Dairy cow*: milk is a symbol of children's growth. Calves compete to get the udder filled with more milk (symbol of jealousy between siblings). Cows can also be a symbol of evil, as in Christian Middle Ages witches poisoned cow's milk to kill children.
10. *Lizard*: Refers to the general context of the animal; tied to its duration of life, representing its own circumstances as a specie.

According to their significance, the drawings have been transformed into sound; each *sings* a story that is meant to be *felt* through listening. As an imaginary journey to be experienced by the viewer, the sonic interpretations portray animals as subjects aware of their own powerful symbolic nature. Being often categorized as *the other*, the animal raises questions in the animal eyes, in the animal skin, in the animal as a real presence.

*Sound of Beasts* soundtrack emphasizes that *the others* also have a language, because "if language is absent, there can be no self, and where there *is* a self, there is always already a language"[7].

The soundtrack was produced using a variety of instruments: an effects pedal for a guitar, which processed the incoming audio signal from a quad tone oscillator circuit. This combination was used to generate and modulate different tones. Same effects pedal was used to manipulate the samples played from the FM3 Buddha Machine II, a loop player that triggers nine different digitally encoded drones. A couple of Korg touchpad interfaces were used to process and produce melodies and musical chords: a mini kaosscilator, which is a synthesizer containing instrument presets that were later processed through a mini kaoss pad, an effects unit that controlled feedback, delay, filters and different sound parameters.

For instance, in the *Mantis Dialogue* piece, I used both kaoss pads to emulate the voice of the mantis. The composition of the track is divided into three stages: the first sound is the voice of the male calling the female with a long and repetitive tone. Then we listen the female voice engaging in the courtship dialogue the male has started. Subtle variations of the same sound in a slightly higher pitch makes one distinguish between the male and female voices. The third stage in the music symbolizes the mating of the mantises. One can hear tone variations until the sound remains as a sustained loop, which means copulation has happened, until the female decapitates and cannibalizes her mate's head and the track ends.

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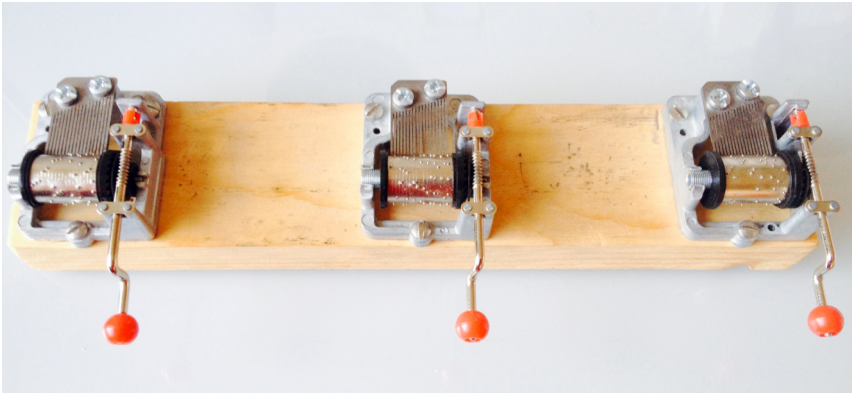
[7] Matthew Calarco. *Zoographies: The Question of the Animal from Heidegger to Derrida.* (New York: Columbia University Press, 2008), 83.

In *Mourning Mongrel* track, a third touchpad interface was used —Kaoss pad 3— to create samples and loops of three music boxes containing the compositions Gymnopedie no.1 by Erik Satie, Les feuilles mortes by József Kozma and a Nocture by Fyderyk Chopin. The music boxes were attached to a piece of wood in order to enhance their resonance. A piezo plugged to the kaoss pad and positioned on the wood amplified the compositions that were later processed with a delay effect, creating an echo by mixing the original signal with delayed signals.



Overview of the music boxes.

The track starts by playing one music box and slowly adding notes from the other two. Consequently, the obtained notes are sampled to create layers of sound that finally unfold a piano melody that continues as a loop throughout the track. The cracking sounds of moving the piezo across the wooden surface can be heard, giving a feeling of warmth to the delayed notes. *Mourning Mongrel* reflects the solitary journey of a homeless dog that wanders from place to place with infinite sadness.

The last instrument used is a graphite oscillator box.[8] I designed an analog circuit that amplifies the signal from graphite traces on the paper and generates different frequencies depending on the electrical conductivity produced by two opposite pole pencils. A couple of pencils or graphite bars attached to an instrument cable are plugged to the box, so one can transform drawing into sound in real time. For the *Elephant Howling*[9] track, I used the graphite oscillator box while drawing and touching the different traces of the elephant drawn. The outcoming sound was processed using a dub echo effect from the mini kaos pad to produce a doleful cry of an elephant dying. A later layer of percussive tones was generated with the quad tone oscillator circuit processed through the guitar effects pedal. The dead corpse finally dissolves through the remanent tones.

My musical choices were exclusively based on intuitive decisions; as the drawings were previously made, finding the sounds that matched the animal was a very natural process, similar to the way I draw. I rarely have a theoretical or rational approach; everything starts as an impulse, as a major energy that needs to get out of the *bodymind*[10]. For I consider the artistic outcome reflects sincerity with my own practise and myself.

During the process of music making I discovered that I was able to draw the intangible qualities of sound through listening. As a visual artist, my approach

[8] For more technical details go to *Sonic Drawings* on page number 51.

[9] The track was published in *Synthesis Vol.1*, a compilation of sound works by women around the world working in the sonic field. Released by *Urban Arts Berlin* in November 14, 2014. https://urbanartsberlin.bandcamp.com/album/synthesis-vol-1

[10] *Bodymind* expresses that there is no separation between mind and body.

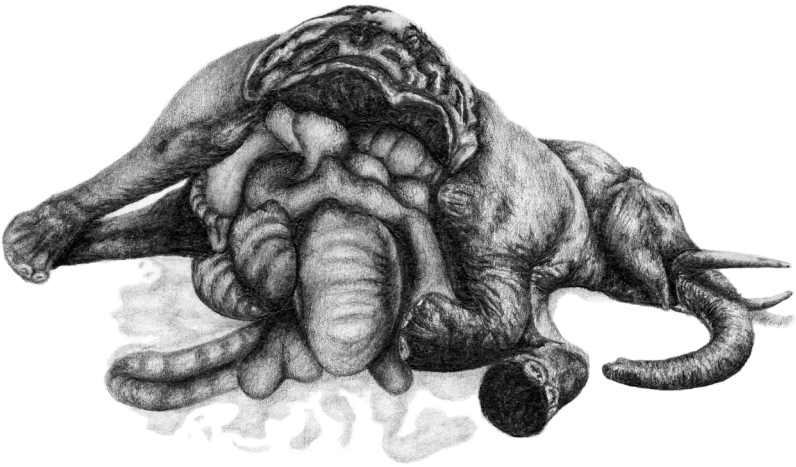
to sound is extremely visual, hence the sound departed from the animal drawing, until the image merged with its sonic equivalent. Sound itself is capable of invading the space, and perhaps for an artist with a unique sonic approach an image is not needed to convey a message. But when a sound invades the space through graphite on paper, it is a way to sculpt and liberate the hidden meaning of drawing in time and space.

From Jacques *Derrida's Bestiary series*
Graphite on paper / 20 x 20 cm / 2012

Audio: *Mantis Dialogue* / 5:26 min / 2014
*https://soundcloud.com/anagutieszca/mantisdialogue*

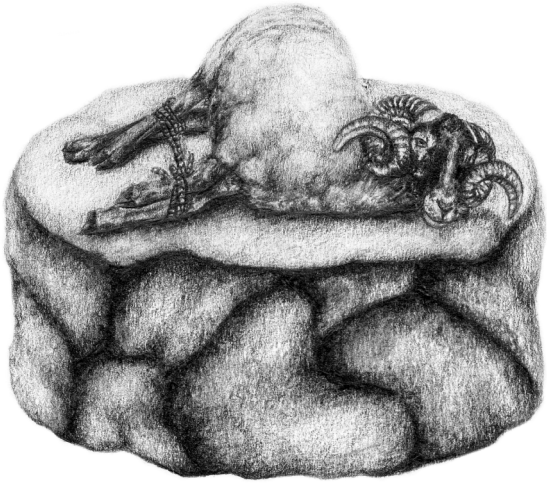
From Jacques *Derrida's Bestiary series*
Graphite on paper / 20 x 20 cm / 2012

Audio: *Mourning mongrel* / 5:11 min / 2015
*https://soundcloud.com/anagutieszca/mourning-mongrel*



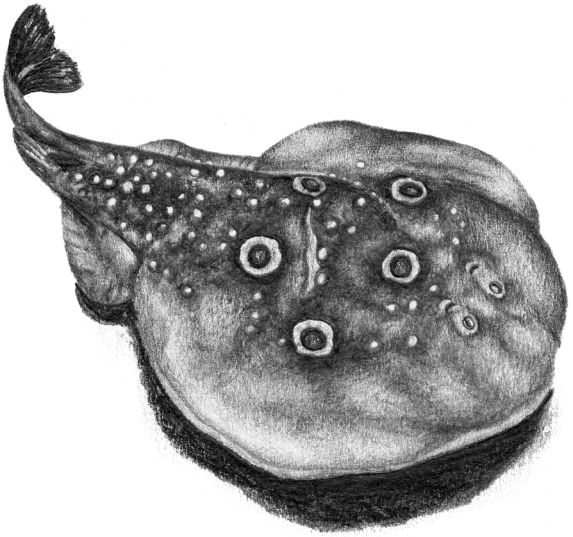
From Jacques *Derrida's Bestiary series*
Graphite on paper / 20 x 20 cm / 2012

Audio: *Elephant howling* / 5:44 min / 2014
*https://soundcloud.com/anagutieszca/elephant-howling*



From Jacques *Derrida's Bestiary series*
Graphite on paper / 20 x 20 cm / 2012

Audio: *Dream of a Goat* / 3:46 min / 2013
*https://soundcloud.com/anagutieszca/dream-of-a-goat*

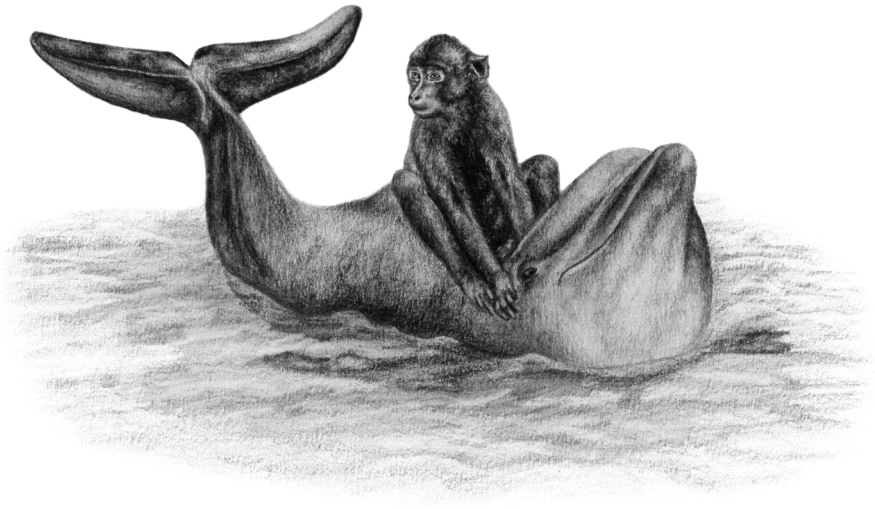


From Jacques *Derrida's Bestiary series*
Graphite on paper / 20 x 20 cm / 2012

Audio: *Torpedo electric organ* / 5:16 min / 2015
*https://soundcloud.com/anagutieszca/torpedo-electric-organ*

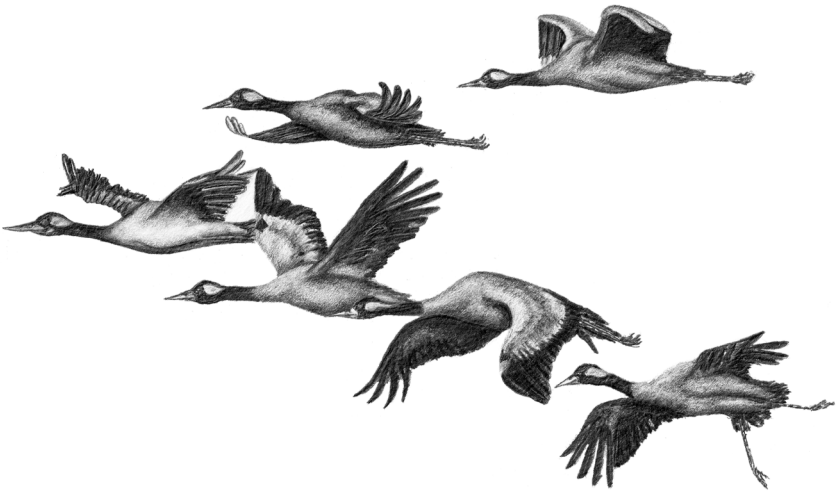
From Jacques *Derrida's Bestiary series*
Graphite on paper / 20 x 20 cm / 2012

Audio: *Vixen's maneuver* / 6:44 min / 2015
*https://soundcloud.com/anagutieszca/vixensmaneuver*



From Jacques *Derrida's Bestiary series*

Graphite on paper / 20 x 20 cm / 2012



From Jacques *Derrida's Bestiary series*

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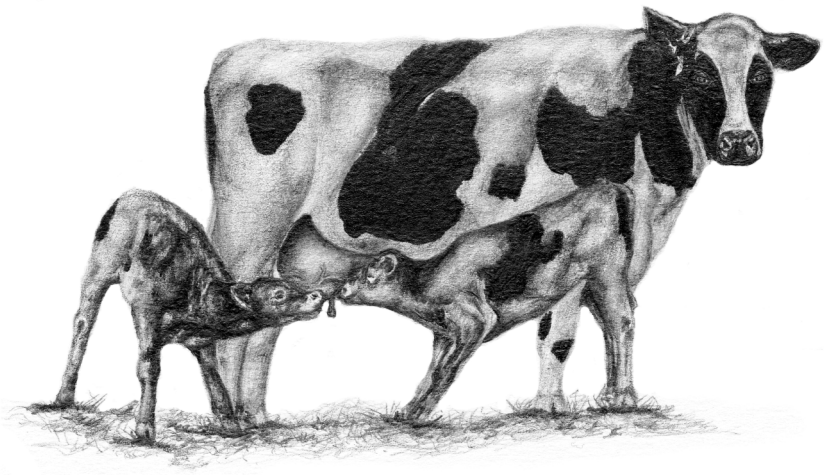


From Jacques *Derrida's Bestiary series*

Graphite on paper / 20 x 20 cm / 2012

From Jacques *Derrida's Bestiary series*

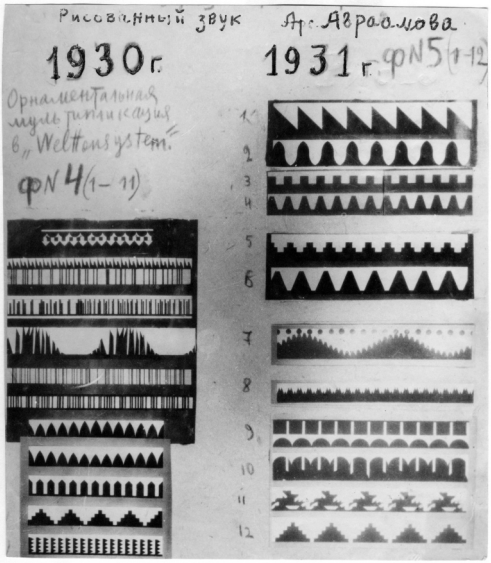
Graphite on paper / 20 x 20 cm / 2012

# II.

# Sound of Drawing

Derived from my experience in regard to the sonification of drawing and after designing my own instrument for it, I discovered that the use of paper and graphic tools for the creation of sound was introduced as early as 1929 in Soviet Russia. Although it was primarily developed as technology for sound on film, it opened up the doors to a new way of music making.

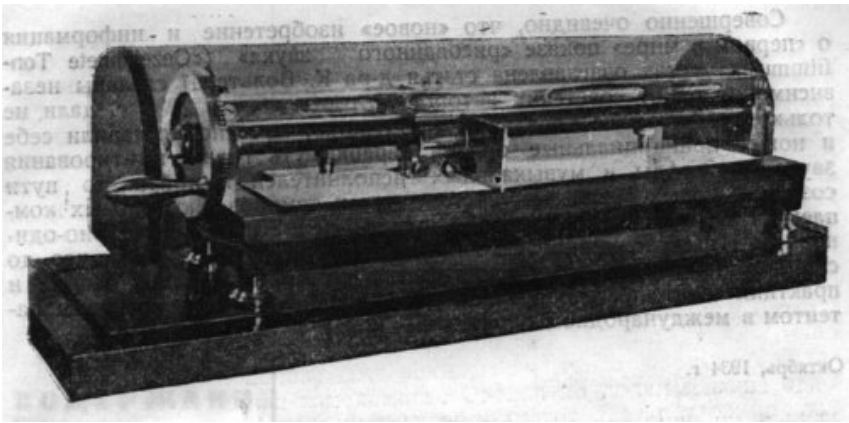
In 1930 composer Arseny Avraamov experimented with drawing methods to produce sound pieces. Based on geometric shapes and ornaments, he shot still images of drawings on an animation stand and created *ornamental soundtracks* in transversal form. His drawn sound technique was highly acclaimed since it allowed the development in parallel of sound and the visual canvas. The common sound recording method with a microphone and a photocell was replaced for drawings on paper, photographing them onto the soundtrack of the film strip, and playing the film strip as a movie with a projector.




Avraamov Arseny. *1930-31 film sound*. [11]

[11] Image taken from: https://monoskop.org/File:Avraamov_Arseny_1930-31_film_sound.jpg#mediaviewer/File:Avraamov_Arseny_1930-31_film_sound.jpg

Another way of obtaining sound was by cutting out paper. Nikolai Voinov, involved also in the production of *ornamental soundtracks* with Avraamov, developed the *Paper Sound* techniques. In 1931 he invented a machine called *Nivotone*, which read strips of paper cutouts of different sizes and shapes and translated them into sound by a photo-electric process.



Nivotone tool. [12]

Following the *Paper Sound* techniques, in the same year, Evgeny Sholpo and Georgy Rimsky-Korsakov created a photo-electronic instrument called *Variophone*. Instead of using paper, they cut sound waves into cardboard discs that produced sound while rotating in synchrony with a 35mm film.

[12] From the book: Andrey Smirnov. *Sound in Z: Experiments in Sound and Electronic Music in Early 20th Century Russia.* (London: Koenig Books and Sound and Music, 2013), 183.

Painter and acoustician Boris Yankovsky also approached graphical sound. He pursued spectral analysis (study of the color of sounds), decomposition and re-synthesis, a technique that he called *synthetic acoustics.* He thought of a universal language of sounds by using combinations of hand drawn spectral sound objects, so the timbre of the sound would be more accurate. His method was close to what is offered today by digital technology, called sound and music computing: the study, understanding, modeling and generating of sound and music through the use of computer technologies.

Numerous experiments with sound and image where almost simultaneously carried out in different parts of the world. For example the Hanert Synthesiser, designed by John Hanert in 1945 in USA. The synthesiser was an instrument for composing electronic music using a moving mechanical head, placed on a 55 cm long table that scanned graphite marks on paper cards of an approximate 70 cm size. The paper cards were able to define the pitch, duration, timbre and volume of a sound. One of the unique features of the instrument was its flexibility in composition and synthesis; new graphite marks could be added to the existent paper cards by just using a pencil, and one could re-arrange the cards in multiple combinations.

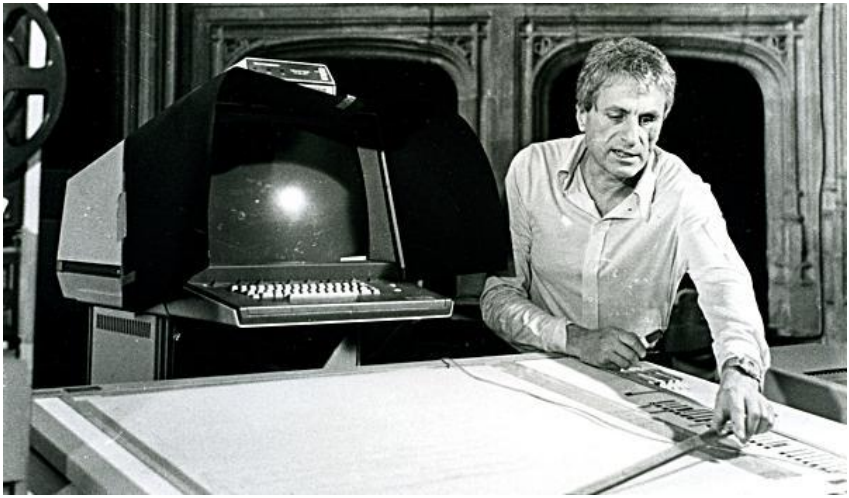
During the early 1960's in the UK, composer and electronic engineer Daphne Oram used a similar technique of converting images into sound to that one applied earlier on the *Variophone*. The *Oramics* consisted of drawing onto a synchronised set of ten 35mm film strips, which overlaid a series of photo-electric cells, generating electrical charges that controlled amplitude, timbre, frequency and duration of a sound.

Daphne Oram working with the Oramics machine.[13]

Additionally, during the late 1970's, Patrick Saint-Jean and Iannis Xenakis developed the UPIC system in France, which was based on the analogue graphical sound syntesis of all the previous examples mentioned above. The UPIC was an intuitive graphical instrument, where the user could draw sound waves and organise them into a musical score, liberating the composer of the conventional restrictions of music notation. Being one of the early computer-based graphic controllers for digital music, this instrument introduced a combination of analogue and digital electronics in the field of music making.

[13] Image taken from: http://daphneoram.org/

Despite of the variety of inventions that dealt with graphical sound during the twentieth century, the machines mainly remained to be used in the laboratory due to their dimensions. Some were not able to respond in real time, so the composer had to wait until all the data was processed and the final output was audible sound. In that sense, it was only possible to record and compose, but not to perform. Nevertheless, technological advancements facilitated the creation of new instruments, providing a musical renovation that offered endless possibilities in the music making with unconventional sources. In the previous examples, drawing on paper combined with analog electronics, has been used as an instrument for sound production. Nowadays, with the digital technology available, it is possible to combine art and music with the least imagined tools.

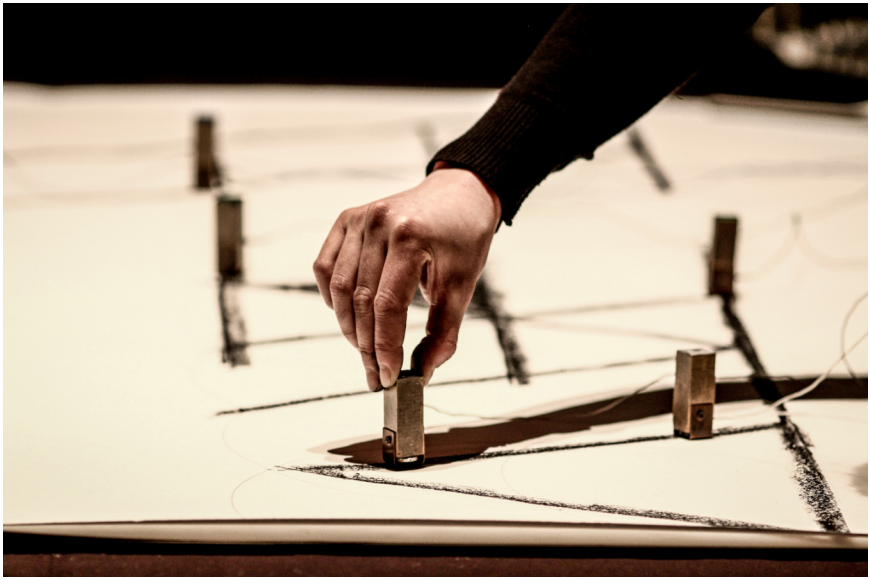


Iannis Xenakis and the UPIC system.[14]

[14] Image taken from: http://joelchadabe.com/articles/xenakiswhoishe.html

## *Graphite and its transformation into sound*

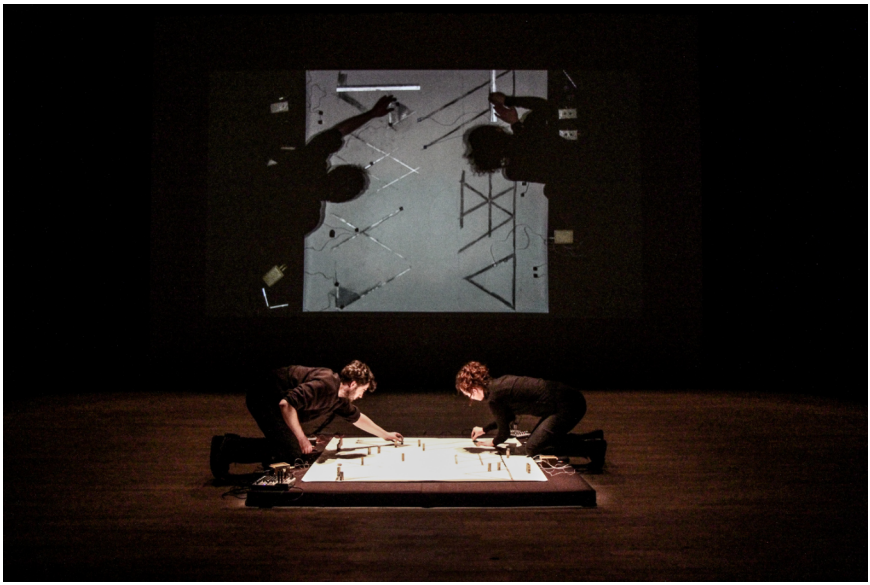
After getting to know the history of graphical sound, I started to look at how graphic techniques and their potential of becoming audible were explored as well more recently by contemporary artists. Leaving aside the analysis of an image to produce sound via photo-electronic means, what interests me is graphite and the sonification of its gestures. Taking advantage of its conductive properties, graphite traces along the canvas can be amplified with an analog circuit;[15] as a consequence one is able to convert drawing into sound and manipulate its diverse qualities.



*Ground*. [16]

[15] More about the analog circuit can be found in *Sonic Drawings*, page 51, where I explain how I designed my own analog circuit for the sonification of drawing.
[16] *Ground* video: https://vimeo.com/72066402

An example of graphite on paper as a sound interface is *Ground*[17], a project realised by Dutch artists Dewi Devree and Jeroen Uyttendaele. As Devree describes on her website, *Ground* is an audiovisual performance where graphite drawings are used as a control interface for several electronic instruments. The gestures of drawing, erasing and touching shape an audiovisual composition; as an alternative to the typical knobs or buttons that an electronic and/or digital instrument has, by using graphite as a variable resistor the artists control and modulate the pitch, amplitude and sound color.

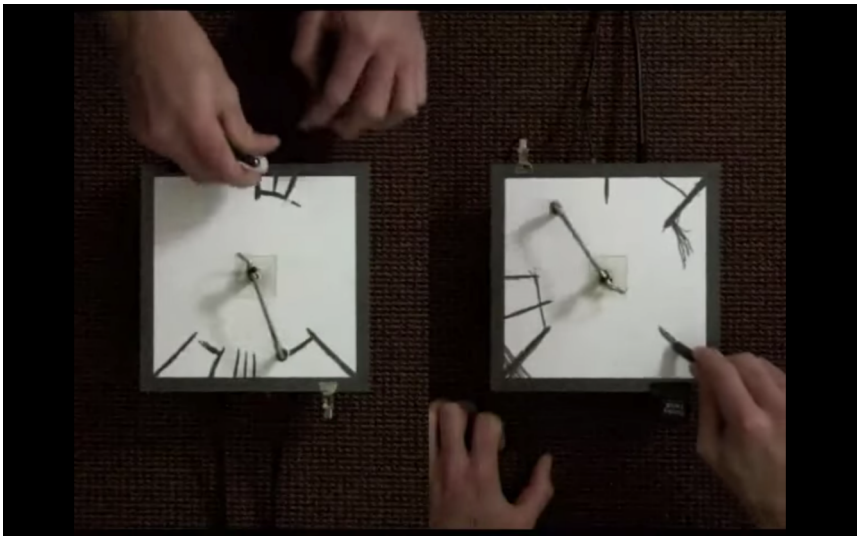


Dewi Devree and Jeroen Uyttendaele.[18]

[17] More about Dewi Devree and *Ground*: http://dewidevree.org/ground/

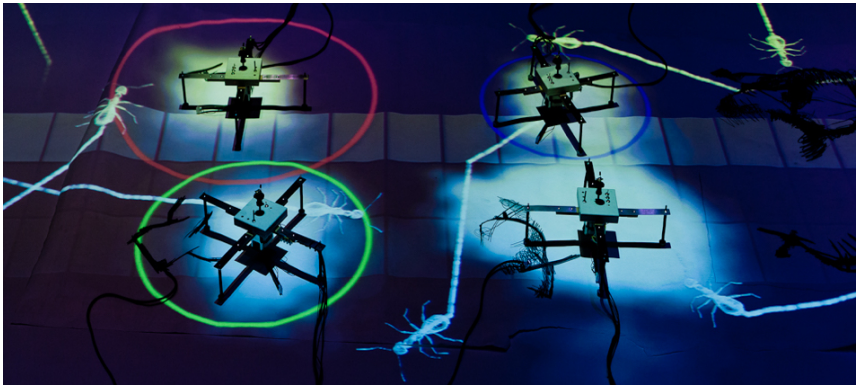
[18] Image taken from: http://dewidevree.org/ground/

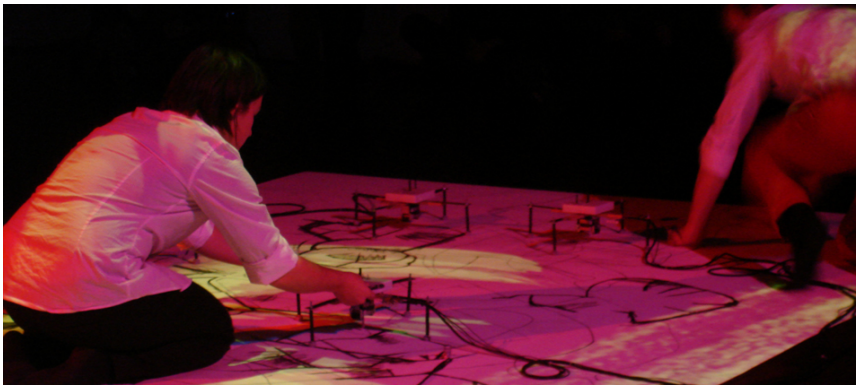
Another project on the same line is *Graphite Sequencers*[19], by the Swedish artist Daniel Skoglund. He creates beats by drawing lines on paper that a rotating arm will read when passing over. Similar to the body and functions of a record player, the BMP (beats per minute) of the graphite sounds can be adjusted by changing the speed in which the arm rotates. The longer a drawn line is, the higher the pitch of the sound becomes.



*Graphite Sequencers.* Still image taken from Daniel Skoglund's video.

[19] *Graphite Sequencers* video: https://www.youtube.com/watch?v=3Kcx8Y1Adyw





Images of *Palimpsest* taken from: http://kathyhinde.co.uk/palimpsest/

Skoglund also worked with the artist Kathy Hinde to create *Palimpsest*[20], an audiovisual performance where *Graphite Sequencers* were used in combination with Hinde's interactive video projections. The sequencers were tracked live using an infrared camera and controlled various parameters of the videos, such as animations of animals walking in the composition, colors used and directions of animated lines. In addition, the actions of the two performers caused chain reactions that affected sound and image simultaneously.

What the earliest graphical inventions have in common with the graphite controllers by Devree, Uyttendaele and Skoglund is the focus on sound. While the first ones were born as a necessity to produce image and sound in parallel, the later ones are artistic reflections that seek to push the boundaries of existing musical instruments and avoid the use of computer synthesis.

Sonically speaking, I find Skoglund's *Graphite Sequencers* admirable and more attractive than *Ground* because of the subtle way he manages to merge the graphite sounds as a drum machine with the rest of the music composition. Drawing simple lines with more or les pressure generates ongoing rhythms and endless tunes. In this way he achieved to use the sequencers as if it would be another electronic musical instrument, similar to a synthesiser. Although the graphite controllers in *Ground* also have their own interesting sonic potential, the most important characteristic is how the gestures of drawing generate the sound. In that sense, making sound becomes an intuitive process as drawing is.

[20] *Palimpsest* video: https://vimeo.com/128296081

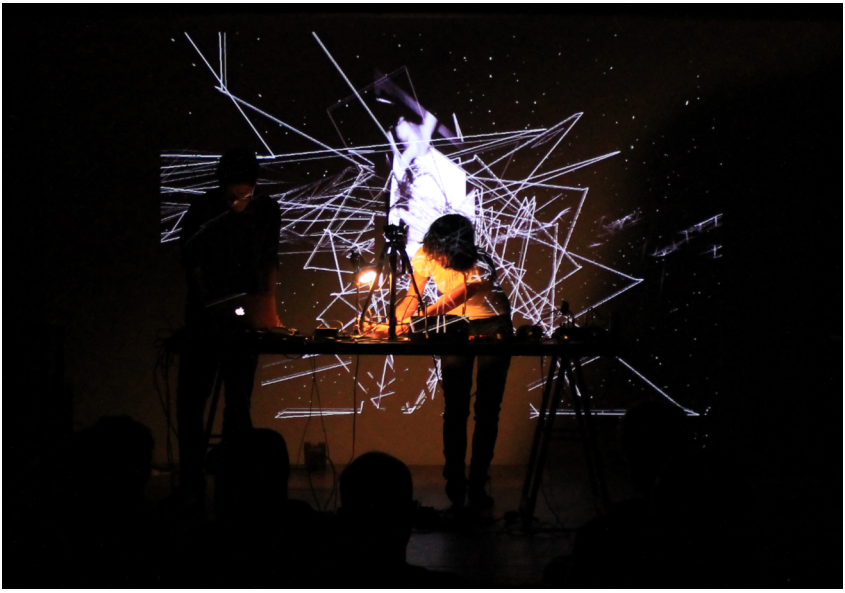
*Ground* and *Palimpsest* encourage the interaction of two performers by drawing on a paper canvas. The approach of working in pairs brings out a playful dialogue that builds a collective audiovisual composition where, spontaneity and creativity, can contribute as a valuable aesthetic aspect. But, in spite of the innovative use of the qualities of graphite, its possibilities as a visual art material have not been fully explored. Both projects emphasize the creation of image and sound in real time, however the drawn visual product is aesthetically weak in comparison to the sonic outcome. The visual composition mainly results in basic drawings of lines, shapes and gradations.

Being only aware of the existence of *Ground* by the time I was designing and performing with my own instrument, my approach as a visual artist inspired me to eradicate the lack of imagination and bleak use of graphite as an artistic medium. Therefore, now I present the projects I embarked on for the sonification of drawing and its gestures.

## *Sonic Drawings*

Audiovisual performance realised under the name of Arta & Spells Disaster. [21]

2013 - 2015



Presented at:

2015 *Uusi Nykyisyys / New Present.* XX Mäntän kuvataideviikot. Mänttä.
Centro Cultural Casa Purcell. Saltillo, Mexico.
*INTER-FACE, International Conference on Live Interfaces*s. Galeria Zé dos Bois (ZDB). Lisbon, Portugal.

*2014* *Sound Room X.* Kultuurikatla Aed. Tallinn, Estonia.
*Sound Room VIII.* Vapaan Taiteen Tila. Helsinki.
*BiteVilnius.* Dailininku sajungos galerija. Vilnius Culture Night. Lithuania.

[21] *Spells Disaster*, also known as Juan Duarte Regino: http://juanduarteregino.com/

*Sonic Drawings* is a performance that explores sound and visual generation through a custom made instrument that enables real time sonification of drawings created on a paper canvas with graphite pencils and conductive ink circuits. This approach has also permitted to introduce a series of open computer vision techniques to augment the experience of traditional drawing.

After designing my own instrument for the sonification of drawing and its gestures, I got interested in exploring its performative aspects as a musical interface that could be played live and in combination with other electronic instruments. The following pages contain a description of how I designed the graphite oscillator boxes, the tools used and the combination of analog & digital technologies that shaped an audiovisual performance. The project is the result of a collaboration with the media artist Juan Duarte Regino.

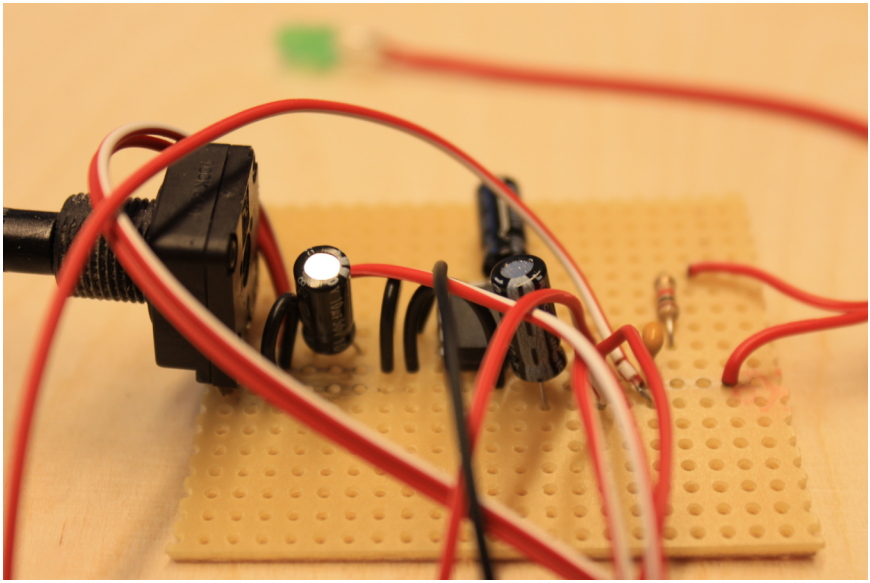

Overview of a couple of graphite oscillator boxes.

For the creation of the graphite oscillator box, an electronic amplifier circuit was implemented as a primarily source of feedback for sonic interaction. The circuit consists of the following components:

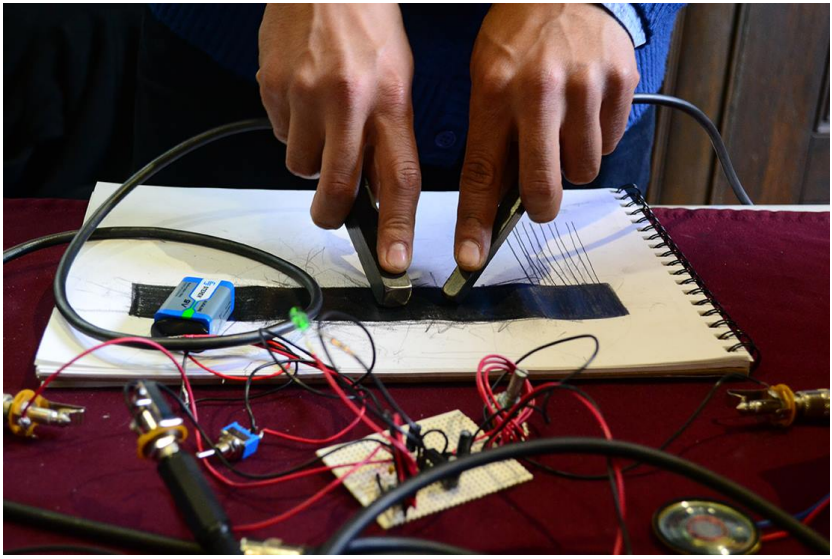
- LM386 ½W low voltage audio amplifier circuit
- Two 1k resistors
- One 1uF ceramic capacitor
- One 100uF capacitor
- Two 10uF capacitors
- One 2N3904 transistor
- One 5mm LED
- One 50K potentiometer
- Four mono audio 6,3 mm jack
- One SDST/SPDT switch
- 9v battery holder

The box has one input for plugging an instrument or piezo and process its sound through the circuit, two inputs for a couple of pencils or graphite bars attached to an instrument cable and one output for connecting a speaker. A potentiometer modulates the pitch of the obtained signal and a LED light connected to a switch shows if the circuit is on or off.

The circuit is used both, to amplify the signal and to generate different frequencies depending on the electrical conductivity produced from using two graphite pencils or bars to draw along the canvas. These two opposite pole pencils create a feedback in the amplification circuit. Hence, depending on the amount of resistance applied on the circuit's feedback points, one can increase or decrease the frequency by dragging the pencils closer or further.



Detail of the circuit for amplification and feedback oscillation.

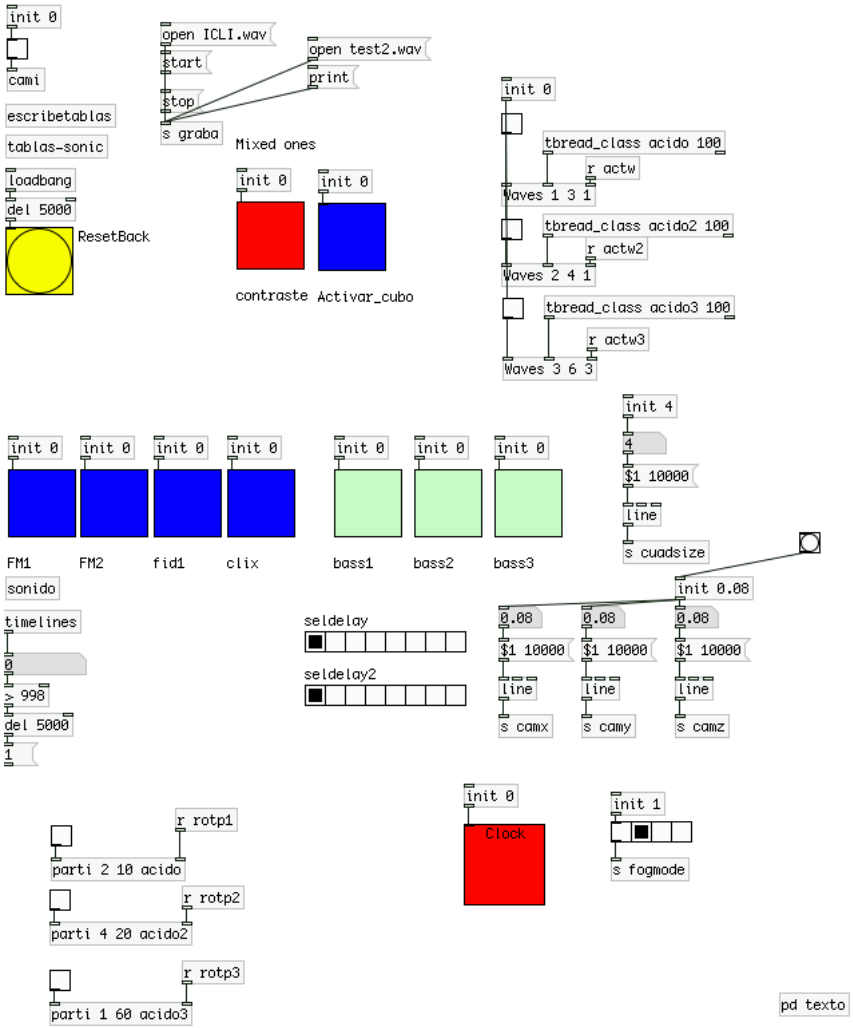


Opposite pole graphite bars creating feedback while dragging them on the canvas.

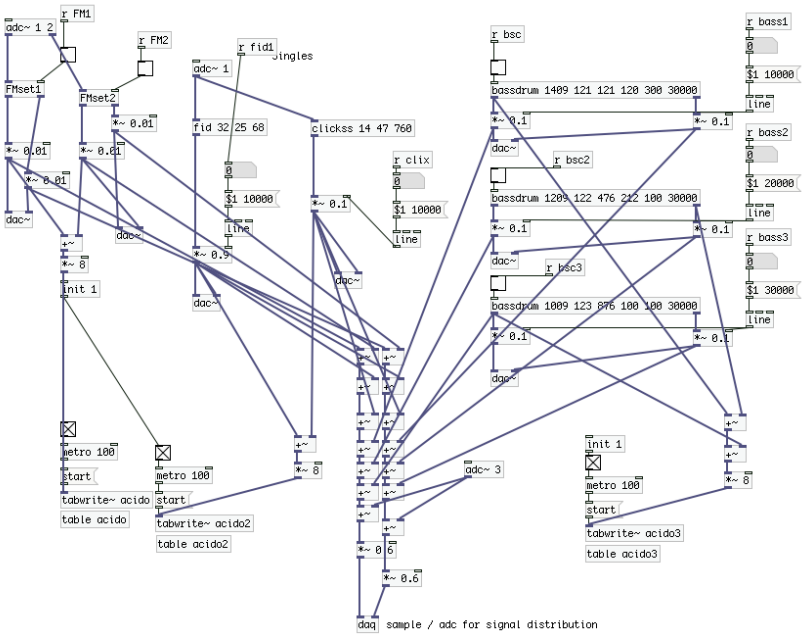
During the sonic and visual performance, a wide variety of frequencies are produced when the instrument is used to draw along different traces of more or less amount of graphite or conductive ink. The number of feedback points and the possible combination of electronic components of the circuit may also open the possibilities for sonic outcome. The obtained signal from the circuit is processed and analysed in two ways simultaneously: with a kaoss pad instrument and a patch created in Pure Data (aka Pd), an open source visual programming language.

The signal from the circuit is used as raw material to create more advanced sound synthesis and visuals generation from it. The first patch I made in Pd consisted of a fiddle object that estimated the pitch and amplitude of the incoming sounds, mapping the obtained signal to release different images. Subsequently, Juan Duarte improved the patch with a series of FM synthesis modules that process the incoming signal from the circuit, and is later modulated against the data obtained from the movement tracking with a camera facing the drawing surface. A kaoss pad is also used to sample and loop fragments of the sound obtained during the performance.

My role in this project was to draw with the graphite oscillator boxes, record and release loops, while Juan Duarte took care of the digital side, triggering different visual compositions on Pd depending on the performance stage and playing a Korg monotribe analog synth and a couple of photo-electronic synthesizers he designed to complement the sonic outcome.




View of the Pd patch.


adc~ 1 2
r FM1
r FM2
FMset1
FMset2
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*~ 0.01
dac~
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*~ 8
init 1
metro 100
start
tabwrite~ acido
table acido
metro 100
start
tabwrite~ acido2
table acido2
r fid1
jingles
adc~ 1
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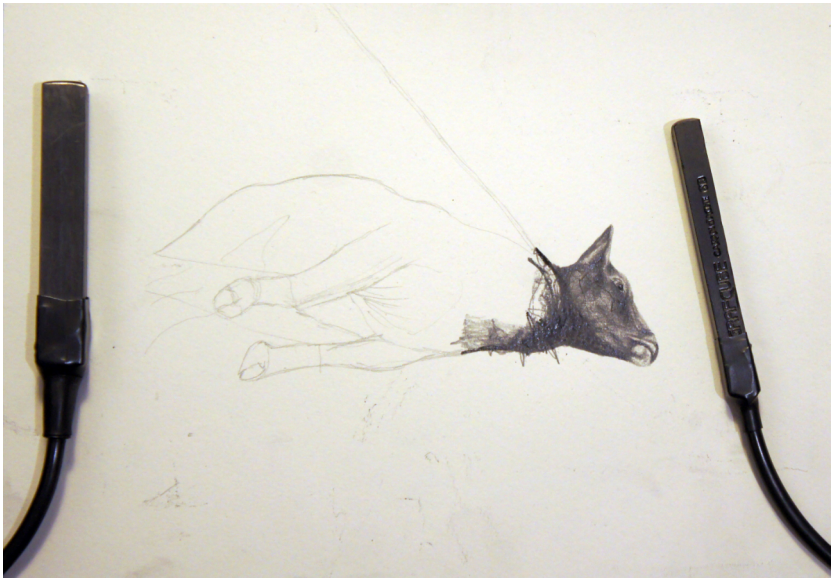
Computer software for motion tracking and visual processing of elements drawn.

*Performance Development, Generative Visuals and Sonic Outcome*

In order to emphasize the aesthetic approach of a traditional fine art technique, a detailed part of the drawing is prepared before the performance and finished throughout the performance. As a starting point, the oscillator circuit is triggered by touching the drawing with both graphite bars which release the first audio signals, the later sound processing is introduced gradually as layers that end up generating an ambience of both recognisable and indirect sound manipulation.



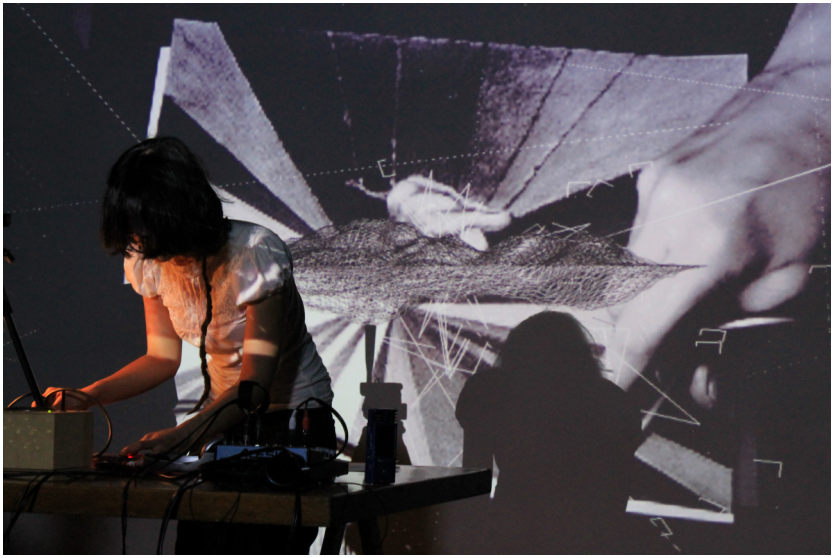
Drawing before the performance.

Drawing after the performance.

Finally the audiovisual outcome connects a drawing performance with playing a sound instrument. The later part of the performance consists of generating live visuals with content from both, the camera and sound reactive visuals. Video processing, particle systems and geometric figures are projected on stage merging with the drawing as the performance unfolds to create a synesthetic experience. The aesthetic choice of the visuals is oriented towards experimental, minimal live electronics and audiovisual immersion.

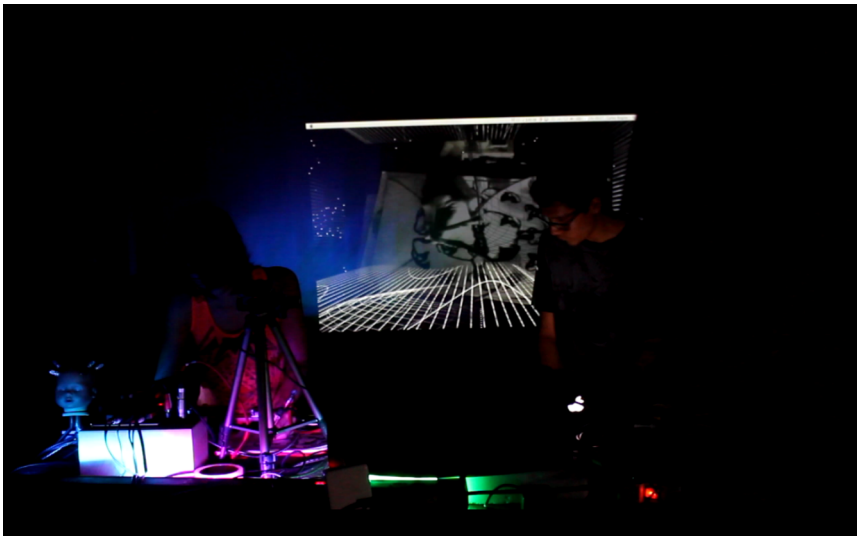
Centro Cultural Casa Purcell. Saltillo, Mexico. 2015.

*Uusi Nykyisyys* I *New Present.* XX Mäntän kuvataideviikot. Mänttä, 2015.

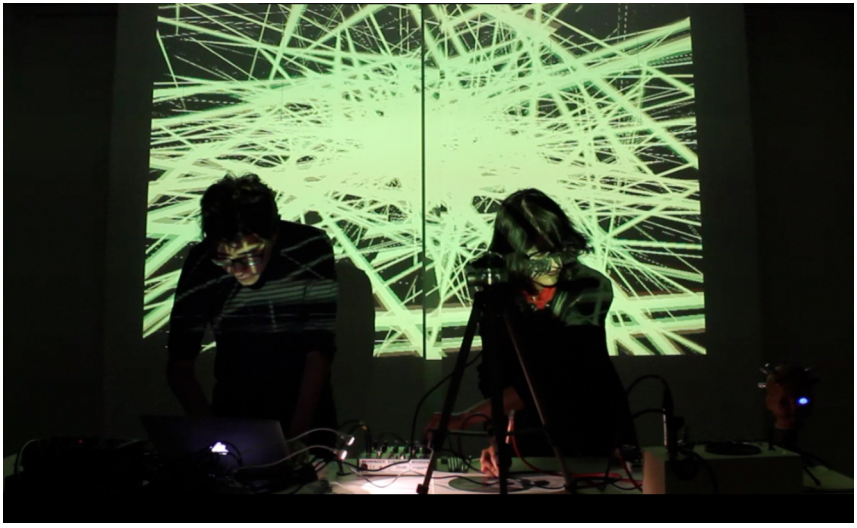


*International Conference on Live Interfaces* [22].Galeria Zé dos Bois, Portugal. 2015.

[22] Video documentation: https://vimeo.com/115295015



*Sound Room X* [23]. Kultuurikatla Aed. Tallinn, Estonia. 2014.



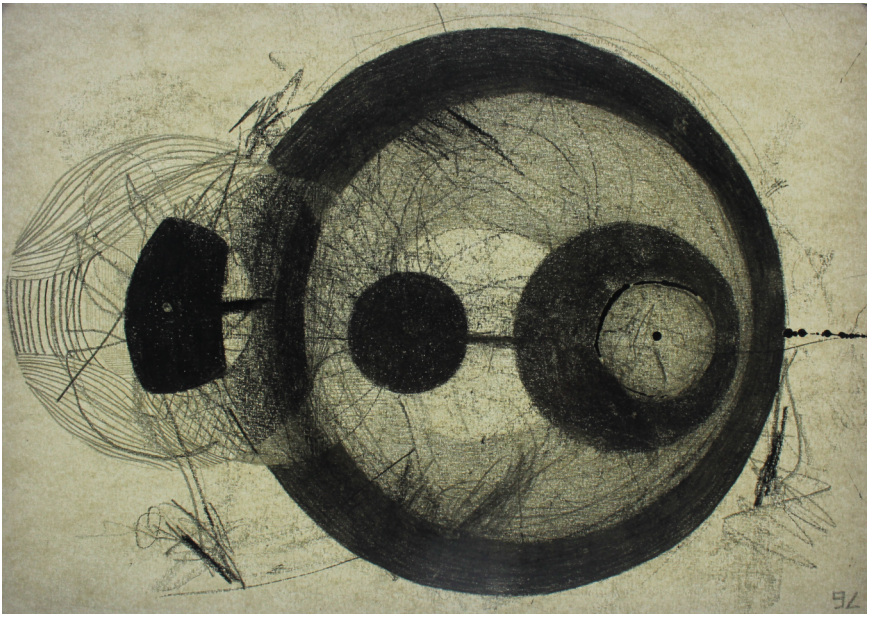
*BiteVilnius* [24]. Dailininku sajungos galerija. Vilnius Culture Night, Lithuania. 2014.

[23] Video documentation: https://vimeo.com/103660850

[24] Video documentation: https://vimeo.com/102779923

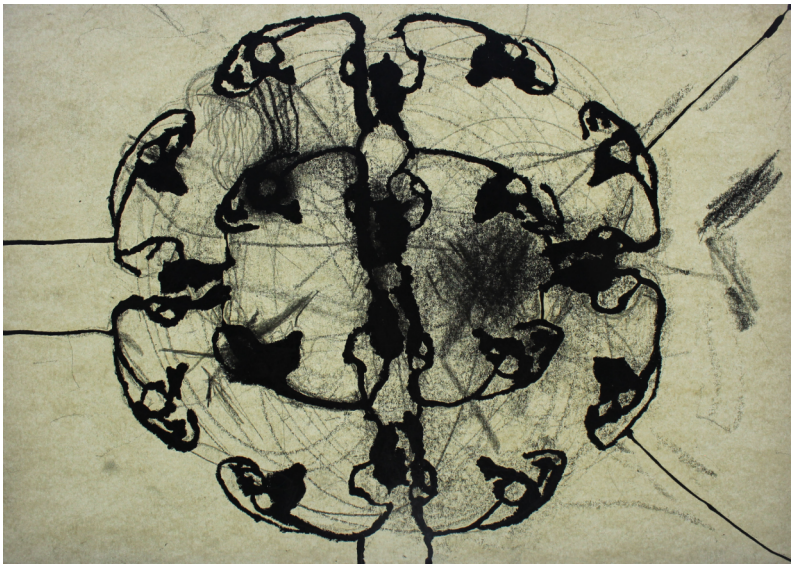
*The Aesthetics of Drawing*

Considering the experience I gained while performing with the graphite oscillator boxes, for the realisation of *Sonic Drawings* I thought of how to extend my drawing aesthetic to the sonic realm. The first method I applied was to prepare a simple but somehow elaborated sketch so I could sonify it in a playful way. I drew circles using pencils with different graphite thicknesses, some of them had gradations inside and others line patterns, so there could be a gap of silence in the sound when the pencils were passing from one line to the other.



Graphite & ink drawing played during the performance at BiteVilnius. Dailininku sajungos galerija, Vilnius Culture Night. Lithuania, 2014.

Few lines were also drawn using conductive ink, as it had the same function as the graphite traces; both are conductive materials that can be used to get an audio signal when positioning both pencils or graphite bars on the marks. While playing the sketch, I found out that the pitch of the ink was higher than the one from the pencils. As a consequence, the second drawing I prepared was made solely using conductive ink.

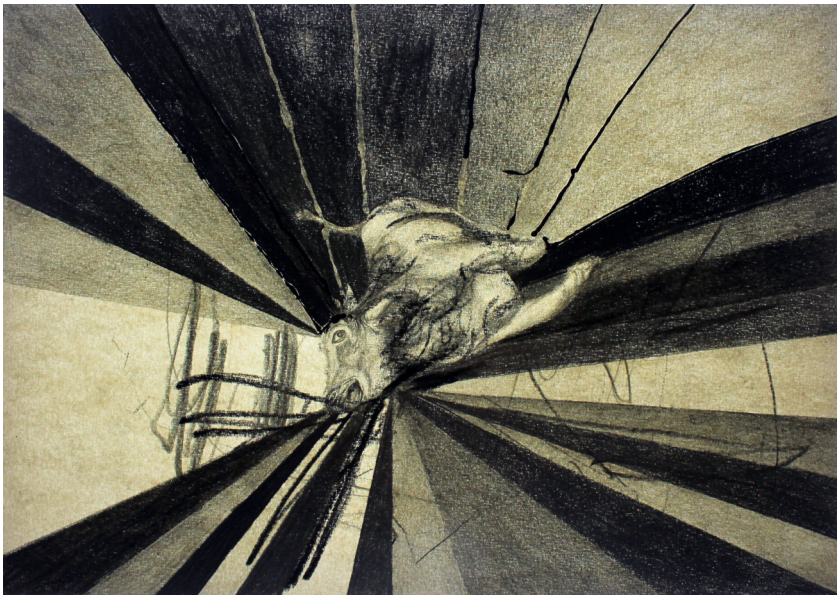


Conductive ink drawing played during the performance at *Sound Room X.* Kultuurikatla Aed, Tallinn. Estonia, 2014.

The visual source for this drawing was one of my previous works scaled to an A4 paper (see image above). With this drawing I discovered that the more ink a trace contained, the higher the pitch of the sound was.

The image of the goat circle was formed by drawing uneven traces diluted with water and applying more ink in specific locations of the visual composition. Due to the different amount of ink used on the drawing, the sonic result was similar to the experience of playing a piano: a clear scale from higher to lower tones could be heard when sliding the pencils over it.

With the previous understanding of how the pitch of the sounds could be manipulated, the following images I prepared where closer to my drawing aesthetic. Addressing the ambivalent presence of *the other*, I drew an agonizing cow and a terrified pig that would be later translated into noise and disruptive sounds during the performance.



Drawings played during the performance at *INTER-FACE, International Conference on Live Interfaces.* Galeria Zé dos Bois, Lisbon. Portugal, 2015.

## *The Book of Repression*

Photograph of a drawing while sculpting its sound with graphite oscillator boxes.

Presented at:

2016 *Contemporáneo Coahuila.* Galería del Instituto de Cultura de Baja California. Tijuana, Mexico.

*The Book of Repression* / Photograph & sound / 43 x 65 cm / 2015

Audio: https://soundcloud.com/anagutieszca/thebookofrepression

In 2014 I accepted a commission (given by Teemu Mäki) from the Israeli curator Guy Morag Tzepelewitz, to take part in *"Plain"*, an artistic project based on the plain brown notebook. The project states that children and adults all over Israel have used the plain notebook for decades, and it is also the cheapest. And these days, when the market is flooded with colorful notebooks full of 3D prints of mainstream cartoons, the plain notebook was cast aside as a washed-out starlet. The project tries to capture the magic of a less commercial era to question its connection to our current reality and reveals that one can create an artwork from the plainest and cheapest materials. The final outcome was an exhibition that gathered the notebooks distributed around the world, at Bet Ha'ir Urban Culture Museum of Tel Aviv, Israel in the year 2014.

For the creation of this piece I was given total artistic freedom, so I decided to combine sound and drawing. *The Book of Repression* consists of a photograph of the book with the original drawing and a sound piece. In the work one can see my hands holding a couple of pencils, which are drawing a pair of dead chicken. A cable is attached on the extremes of the pencils and plugged to a graphite oscillator box, the instrument in question that I developed to make my animals speak. While the instrument measured the conductivity of drawing traces on the paper, a soundtrack of the image was created, so the act of drawing that is usually captured by the eyes became audible and reached the ears. In this way, the connection between mind (which produces the image) and hand (which produces the sound) as an intuitive process was portrayed; drawing begets sound as sound begets drawing.

The sound piece was produced simultaneously with the drawing, therefore it was mandatory to think about the visual as well as the sonic aesthetic. As the graphite pencils produce a particular sound depending on the amount of graphite on the traces and the proximity of the hands, two senses were involved in the creation of the work. This characteristic turns the piece into a multisensory artwork that is created for the eyes and the ears. When one is receptive, it unites both senses producing something that can be further understood through images and sound.

For the sonic realisation I used two graphite oscillator boxes at the same time. One was processed with a kaoss pad touch interface to add a delay effect that would resonate throughout the sonic space, while the other was used without any extra additions. The four pencils where sometimes touching each other, as a consequence they generated an interesting sound sequence similar to a bass drum. In the track, a shriek of torment is portrayed; the sound depicts the moment just before the pair of chicken is about to die, capturing the sorrow of eternally condemned souls.

During the creation of the piece I learnt that when using two graphite oscillator boxes simultaneously, the four pencils and graphite bars merged into a single one to generate beats and rhythms resembling a drum sequencer. Consequently, further drumbeats with a techno-electronic-minimalist aesthetic can be played.

The final artwork is a photograph that illustrates the act of drawing through a sound piece. Due to the background of the artistic project, I was inspired by the Israeli-Palestinian conflict: the never-ending fight for an ethnically preferential state and the military occupation with an extremely oppressive behaviour toward Palestinians. Hence the name of the artwork, *The Book of Repression*, which considers society as the agency of violence.

*Sound of a Dead Body*

Drawing and sound performance

Presented at the exhibition *Women Communicating Across and Through Arts*
Kulttuurikeskus Caisa, Helsinki.
March 5, 2015.

Photo: Eeva Karhu.

*Sound of a Dead Body*[25] is the continuation of my work which embraces the drawing and sound aesthetics in a performance context. The project departs from a white canvas where the silhouette of a dead cow has been previously sketched. The performance begins by drawing the corpse using four graphite bars plugged to the oscillator boxes. The outcoming signal from one box is processed with a kaoss pad effects unit in order to sample and trigger different sound events. The second box is processing one loop coming from the FM3 Buddha Machine II, which adds a melody on the background.

In this work, a silent two-dimensional piece is extended to an aural dimension. A drawing is normally seen as the outcome of a private communication process between the mind and the hand's muscles and remains as an intimate act between the artist and his/her practise. As a result of its sonification, the tones and colors of that drawing process can be translated into a shared experience, going beyond a non-spoken language that communicates through symbolic elements.

The difference of this artwork with the aforementioned *Sonic Drawings* is mainly that I was interested in using the graphite oscillator boxes without any computer involved and on a larger canvas. My greatest question was how to translate a detailed aesthetic into a bigger size in twenty minutes and still preserve its artistic qualities. My previous sonified drawings were made on A4 size papers so it could be convenient to transport them from one place to another. Also for performative reasons, so the process of changing in between sketches and sound layers could be done in few seconds.

[25] Video documentation: https://vimeo.com/121586683

Having no size limitation and avoiding the use of a camera, I used a paper canvas of 100 x 140 cm so the audience could experience the entire process without looking at a screen. The outcome of this large-scale drawing resulted in extremely flexible graphite traces on the canvas, and not entirely focused on the tiniest details (as I normally do) of the animal but on shaping its body with a total hand freedom, and according to the sound I heard.

The performance was presented as a 20-minute live act during the opening of the exhibition *Women Communicating Across and Through Arts,* in Kulttuurikeskus Caisa. It was documented on video and exhibited along with the drawing and sound piece throughout the exhibition.

Drawing performance.

Exhibition view.

# III.

# The Ultimate Drawing

My fascination for making audible drawings guided me to reflect on how by drawing one creates something that does not exist. Hence the act of drawing offers the possibility to reinvent oneself and one's environment. It is a universal language, another form of communication by means of feeling and images. Drawing is also a cognitive activity related to conceptual discovery, for instance, children's drawing is fundamental for the perception and comprehension of the world and what surrounds them. Moreover, while drawing one can reach to an understanding of a concept and latent intention; it reveals hidden processes in the mind by conveying information in an evaluative aspect. Listening can also reveal information that might not be comprehended immediately, but as Morton Feldman once said, "…*sound is comprehensible in that it evokes a sentiment, though the sentiment itself may be incomprehensible and far reaching. But it is noise that we really understand. It is only noise which we secretly want, because the greatest truth usually lies behind the greatest resistance".*[26]

After obtaining sound out of graphite traces, I understood that sound is also a method of drawing. Once it is detached from the paper or image that produces it, sound becomes uncontrollable. In this transition from one state to another, it travels from the darkness of graphite to cracks and unknown places. Sound then turns into drawing in time and space; it makes visible the invisible and audible the imperceptible. This idea of making the inaudible audible was earlier explored by John Cage around 1950's. The same way I used my self-made amplification circuit to generate and sonify drawing and its

[26] Christoph Cox and Daniel Warner, ed. *Audio Culture. Readings in Modern Music*. (New York: The Continuum International Publishing Group Ltd, 2004), 15.

gestures, he used amplification to free sounds from the materiality of the object or event. In this way, *small sounds* (that is, sounds which are so quiet and subtle that need amplification to be heard) or sounds that were silenced, became audible, or as Douglas Kahn would say, *significant noises*[27].

With the knowledge I acquired while designing my own instruments, I have learnt how to manipulate a visual material in a sonic way. This multidisciplinary approach has also made me aware of how by using inexpensive materials as graphite, paper and electronic components, one is able to create and engage with innovative forms of art that question the traditional methods of art making. In addition, I have developed a deep interest in electronics, digital technologies and the DIY (do it yourself) culture, which encourages the empowerment of individuals and communities to find alternative approaches to those ones imposed by society and/or mainstream methods.

What I envision for the future sonification of drawings is the further improvement of the graphite oscillator boxes. This can be achieved by testing different electronic components in order to add variations that enrich the sonic outcome. Also, after learning about electronics, another idea that resonates in my mind is the creation of a new analog instrument that can be combined with the graphite oscillator boxes. Experimenting with the 555 timer circuit, quad tone oscillators and light sensors among others, will allow me to manipulate different sound parameters without the need of using a commercial prefabricated instrument. Additionally, the performance context

[27] Douglas Kahn. *Noise, water, meat: a history of sound in the arts.* (London: The MIT Press, 1991).

can be enhanced by designing a new box that could handle more than two pencils at a time and/or a set of ten boxes, for example, so each can control a sound parameter and add a new sound layer to the composition. For the design of the boxes, I can think of a totally different case than the wooden ones I have made. For instance, finding another interesting material to build it and playing with the location of the switches, knobs and jack inputs and outputs, forming geometrical shapes that resemble a mandala and that can be connected somehow to the content of the drawing.

Regarding the visual side of the project, I keep thinking on how to completely dominate a fine and delicate drawing with a sound composition created at the same time. Until now I have explored both, the method of sketching before the performance and drawing live, but still strive to refine the drawing outcome. An idea I plan to implement is the creation of a conductive drawing on a big canvas (100 x 100 cm minimum) made with ink and graphite bars of different thicknesses. The core of the project is to produce a visual composition that can act in a similar way an electronic musical instrument does, being able to locate what sounds can be triggered in a specific part of the drawing —as if it was a button, fader or knob that triggers a sound— so a sonic composition can be played. Another project idea is to embed drawings with visible electronic components, which will be an essential part of the visual composition as the drawn images are. The drawings will be realised with a mix of graphite pencils/bars plugged to the oscillator boxes and conductive ink, so a soundtrack can be simultaneously made. As a result, ink, pencil circuits, the embedded components, contact microphones and small loudspeakers will constantly play the recording of the soundscape obtained from each piece.

Throughout this artistic journey that has led me to explore image and sound in a multisensory approach, I have come to the conclusion that in my work, drawing and sound depend on each other to exist; the respective characteristics and qualities of one are dependant on the existence of the other. As a consequence, there are always two realities exposed: the first is discovered through direct contact of the eyes with the canvas, while the second remains silent until it is amplified through sound. Each element, whether it is image or sound, inspires emotions and alters at least one of our senses. With the fusion of both elements, the effect is multiplied in relation to the perception, but also in terms of its communicative power.

And finally I keep wondering, what does it mean to experience sound through the eyes and drawings through the ears? The potentiality of sound as an art form is immeasurable, capable of questioning how we see and how we listen, and challenge perception. After all, human or nonhuman animals, we are all sentient beings with different skin. And the animal in me has been liberated through drawing and sound, conquering unimaginable spaces in the physical as well as in the spiritual world.

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